

IN THE CLAIMS:

Please amend the claims as follows:

- sub B17
- Al
1. (Currently Amended) An apparatus ~~including a mass storage device, said mass storage device having a plurality of sectors, said apparatus including~~
a mass storage device including one or more disk drives, each disk drive having a plurality of storage blocks, each of said storage blocks block including a plurality of said sectors;
 wherein each storage block of said plurality of storage blocks block includes a data portion and an error code portion, ~~wherein~~ said data portion storing is responsive to data for said storage data block, ~~and wherein~~ said error code portion being is responsive to said data portion data for a plurality of said sectors in each said storage block.
 2. (Currently Amended) An apparatus as in claim 1, wherein said ~~mass storage device includes one or more~~ disk drives are hard disks.
 3. (Currently Amended) An apparatus as in claim 1, wherein said disk drives are part of mass storage device includes a RAID storage device.
 4. (Original) An apparatus as in claim 3, wherein said RAID storage device is a RAID level 4 device.

5. (Original) An apparatus as in claim 1, wherein said error code portion is appended to said data portion.

6. (Currently Amended) An apparatus as in claim 1, wherein said error code portion includes a checksum of ~~the said data for said data block~~.

7. (Currently Amended) An apparatus as in claim 6, wherein said checksum ~~of said data for said data block~~ includes 4-bytes of checksum data.

8. (Currently Amended) An apparatus as in claim 6, wherein said checksum is included in a block-appended checksum.

9. (Currently Amended) An apparatus as in claim 8, wherein said block-appended checksum includes a further checksum for checking integrity of said block-appended checksum.

10. (Currently Amended) An apparatus as in claim 9, wherein said further checksum ~~of said block-appended checksum~~ includes 4-bytes of data.

11. (Original) An apparatus as in claim 1, wherein said mass storage device includes a cache or RAM.

12. (Currently Amended) An apparatus as in claim 1, wherein said disk drives
~~mass storage device includes one or more hard disks are~~ formatted with 520-bytes per sector.

13. (Currently Amended) An apparatus as in claim 1, wherein said plurality of
said sectors included in each of said storage blocks is eight sectors.

14. (Original) An apparatus as in claim 1, wherein said error code portion
includes 64-bytes of error code data.

15. (Original) An apparatus as in claim 1, wherein said data portion includes
4,096-bytes of data.

16. (Original) An apparatus as in claim 1, wherein said sectors include 520-bytes
of data storage.

17. (Original) An apparatus as in claim 1, wherein said storage block includes
4,160-bytes of data and error code storage space.

18. (Currently Amended) An apparatus ~~for protecting a mass storage device from~~
~~data storage errors, said mass storage device having a plurality of sectors, said apparatus~~
including

a mass storage device including one or more disk drives, each disk drive having a plurality of storage blocks, each of said storage blocks including a plurality of said sectors; wherein for each storage block of said plurality of storage blocks, a first subset of each said storage block is responsive to data for said storage block, ; wherein a second subset of each said storage block is responsive to error code information, ; and wherein said error code information is responsive to said data for a plurality of said sectors in each said storage block.

19. (Currently Amended) An apparatus as in claim 18, wherein said ~~mass storage device includes one or more~~ disk drives are hard disks.

20. (Currently Amended) An apparatus as in claim 18, wherein said disk drives are part of ~~mass storage device includes a~~ RAID storage system.

21. (Original) An apparatus as in claim 20, wherein said RAID storage system is a RAID level 4 system.

22. (Original) An apparatus as in claim 18, wherein said second subset is appended to said first subset.

23. (Currently Amended) An apparatus as in claim 18, wherein said error code information includes a checksum of said data ~~for said storage block~~.

24. (Currently Amended) An apparatus as in claim 23, wherein said checksum ~~of said data for said storage block~~ includes 4-bytes of checksum data.

25. (Currently Amended) An apparatus as in claim 23, wherein said checksum is included in a block-appended checksum.

AC 26. (Currently Amended) An apparatus as in claim 25, wherein said block-appended checksum includes a further checksum for checking integrity of said block-appended checksum.

27. (Currently Amended) An apparatus as in claim 26 wherein said further checksum of said block-appended checksum includes 4-bytes of data.

28. (Original) An apparatus as in claim 18 wherein said mass storage device includes a cache or RAM.

29. (Currently Amended) An apparatus as in claim 18 wherein said disk drives ~~mass storage device includes one or more hard disks~~ are formatted with 520-bytes per sector.

30. (Currently Amended) An apparatus as in claim 18, wherein said plurality of said sectors included in each of said storage blocks is eight sectors.

31. (Original) An apparatus as in claim 18, wherein said second subset includes 64-bytes of error code data.

32. (Original) An apparatus as in claim 18, wherein said first subset includes 4,096-bytes of data.

33. (Original) An apparatus as in claim 18, wherein said sectors include 520-bytes of data storage.

34. (Original) An apparatus as in claim 18, wherein said first and second subsets together include 4,160-bytes of data and error code storage space.

35. (Currently Amended) A method for protecting data from data storage errors in ~~a mass storage system, said mass storage system having a plurality of sectors~~, said method including

determining a plurality of storage blocks in a disk drive of a mass storage system having one or more disk drives, each of said storage blocks ~~block~~ including a plurality of said sectors;

for each storage block of said plurality of storage blocks, dividing each said storage block into a first subset and a second subset, and; generating error code information responsive to data for a plurality of said sectors in ~~each~~ said storage block;

wherein for each said storage block, said first subset is responsive to said data for ~~said storage block;~~, and wherein said second subset is responsive to said error code information.

36. (Currently Amended) A method as in claim 35, wherein said ~~mass storage system includes one or more~~ disk drives are hard disks.

37. (Currently Amended) A method as in claim 35, wherein said disk drives are ~~part of mass storage system includes~~ a RAID storage system.

38. (Original) A method as in claim 37, wherein said RAID storage system is a RAID level 4 system.

39. (Original) A method as in claim 35, wherein said second subset is appended to said first subset.

40. (Currently Amended) A method as in claim 35, wherein said error code information includes a checksum of ~~the~~ said data ~~for said storage block~~.

41. (Currently Amended) A method as in claim 40, wherein said checksum ~~of said data for said storage block~~ includes 4-bytes of checksum data.

42. (Currently Amended) A method as in claim 40, wherein said checksum is included in a block-appended checksum.

43. (Currently Amended) A method as in claim 42, wherein said block-appended checksum includes a further checksum for checking integrity of said block-appended checksum.

44. (Currently Amended) A method as in claim 43, wherein said further checksum of said block-appended checksum includes 4-bytes of data.

45. (Original) A method as in claim 35, wherein said mass storage system includes a cache or RAM.

46. (Currently Amended) A method as in claim 35, wherein said disk drives ~~mass storage system includes one or more hard disks~~ are formatted with 520-bytes per sector.

47. (Currently Amended) A method as in claim 35, wherein said plurality of said sectors included in each of said storage blocks is eight sectors.

48. (Original) A method as in claim 35, wherein said second subset includes 64-bytes of error code data.

49. (Original) A method as in claim 35, wherein said first subset includes 4,096-bytes of data.

50. (Original) A method as in claim 35, wherein said sectors include 520-bytes of data storage.

51. (Original) A method as in claim 35, wherein said first and second subsets together include 4,160-bytes of data and error code storage space.

52. (Currently Amended) A method for efficiently detecting data errors in a mass storage system, said mass storage system including one or more disk drives, each disk drive having a plurality of storage blocks composed of a collection of sectors, including

reading data and error code information located in each of said storage blocks in a single operation;

calculating run-time error code information for said data located in storage blocks;

and

comparing said error code information with said run-time error code information.

53. (Currently Amended) A method as in claim 52, wherein said ~~mass-storage system includes one or more~~ disk drives are hard disks.

54. (Currently Amended) A method as in claim 52, wherein said disk drives are part of mass-storage system includes a RAID storage system.

55. (Original) A method as in claim 52, wherein said RAID system is a RAID level 4 system.

56. (Currently Amended) A method as in claim 52, wherein said error code information is appended to said ~~reading~~ data.

57. (Currently Amended) A method as in claim 52, wherein said error code information includes a checksum of ~~the~~ said ~~reading~~ data.

58. (Currently Amended) A method as in claim 57, wherein said checksum ~~of said reading data~~ includes 4-bytes of checksum data.

59. (Currently Amended) A method as in claim 58, wherein said checksum is included in a block-appended checksum.

60. (Currently Amended) A method as in claim 59, wherein said block-appended checksum includes a further checksum for checking integrity of said block-appended checksum.

61. (Currently Amended) A method as in claim 60, wherein said further checksum of said block-appended checksum includes 4-bytes of data.

62. (Original) A method as in claim 52, wherein said mass storage system includes a cache or RAM.

63. (Currently Amended) A method as in claim 52, wherein said disk drives ~~mass storage system includes one or more hard disks~~ are formatted with 520-bytes per sector.

64. (Currently Amended) A method as in claim 52, wherein said collection of sectors composing each of said storage blocks is eight sectors.

65. (Original) A method as in claim 52, wherein said error code information includes 64-bytes of error code data.

66. (Original) A method as in claim 52, wherein said reading data includes 4,096-bytes of data.

67. (Original) A method as in claim 52, wherein said sectors include 520-bytes of data storage.

68. (Original) A method as in claim 52, wherein said reading data and error code information together includes 4,160-bytes of data and error code storage space.

A (69. (Original) A method as in claim 52, including determining whether said run-time error code information and said error code information in said storage blocks are equivalent.

70. (Original) A method as in claim 52, including alerting said mass storage system if said run-time error code information and said error code information in said storage blocks are not equivalent.

71. (Original) A method as in claim 52, including retrieving said reading data if said run-time error code information and said error code information in said storage blocks are equivalent.